

What is claimed is:

- 1        1.        A method for adaptation of a computer system, network or  
2        subsystem comprising developing a design for the system and  
3        performing an automated loop comprising implementing the design;  
4        analyzing operation of the design after said implementing; and  
5        modifying the design based on results of said analyzing.
  
- 1        2.        The method according to claim 1, further comprising forming  
2        models of components of the system and applying results of said  
3        analyzing to the models.
  
- 1        3.        The method according to claim 2, wherein said applying results  
2        of said analyzing to the models indicates utilization of a component of  
3        the system.
  
- 1        4.        The method according to claim 3, wherein said modifying the  
2        design is performed in response to the utilization.
  
- 1        5.        The method according to claim 4, wherein said modifying is also  
2        performed in response to a desired headroom level.
  
- 1        6.        The method according to claim 5, wherein said desired headroom  
2        level provides that components of the system operate at less than 100%  
3        utilization.
  
- 1        7.        The method according to claim 7, wherein said desired headroom  
2        level provides that components of the system operate at more than 100%  
3        utilization.

1 8. The method according to claim 1, wherein said implementing the  
2 design comprises forming a plan and then implementing the plan.

1 9. The method according to claim 1, wherein said system comprises  
2 a CPU farm.

1 10. The method according to claim 1, wherein said system comprises  
2 a data caching system.

1 11. The method according to claim 1, wherein said system comprises  
2 a database system.

1 12. The method according to claim 11, wherein said modifying  
2 comprises modifying indices of the database system.

1 13. A method for adaptation of a data storage system, comprising  
2 developing a design for the data storage system and performing an  
3 automated loop comprising implementing the design; analyzing  
4 operation of the design after said implementing; and modifying the  
5 design based on results of said analyzing.

1 14. The method according to claim 13, further comprising forming  
2 models of components of the data storage system and applying results of  
3 said analyzing to the models.

1 15. The method according to claim 14, wherein said applying results  
2 of said analyzing to the models indicates utilization of a component of  
3 the data storage system.

1 16. The method according to claim 15, wherein said modifying the  
2 design is performed in response to the utilization.

1 17. The method according to claim 16, wherein said modifying is  
2 also performed in response to a desired headroom level.

1 18. The method according to claim 17, wherein said desired  
2 headroom level provides that components of the data storage system  
3 operate at less than 100% utilization.

1 19. The method according to claim 17, wherein said desired  
2 headroom level provides that components of the data storage system  
3 operate at more than 100% utilization.

1 20. The method according to claim 13, wherein said implementing  
2 the design comprises forming a plan for migrating data and then  
3 implementing the plan.

1 21. The method according to claim 20, wherein said forming a plan  
2 comprises forming a directed multigraph and computing a maximum  
3 general matching.

1 22. The method according to claim 13, wherein said analyzing  
2 comprises forming a trace of storage system events and forming a  
3 workload characterization based on the trace.

1 23. The method according to claim 22, wherein said workload  
2 characterization comprises a number of parameter values that  
3 summarize the trace.

1 24. The method according to claim 23, further comprising forming  
2 models of components of the data storage system and applying said  
3 workload characterization to the models.

1 25. A method for adaptation of a data storage system, comprising:  
 2 developing a design for the data storage system;  
 3 implementing the design;  
 4 forming a trace of storage system events;  
 5 forming workload characterization from the trace;  
 6 applying the workload characterization to models of components  
 7 of the data storage system, wherein said applying indicates utilization of  
 8 a component of the data storage system; and  
 9 modifying the design in response to the utilization indicated by  
 10 said analyzing.

1 26. The method according to claim 25, wherein said modifying  
 2 results in a modified design and further comprising implementing the  
 3 modified design.

1 27. The method according to claim 26, wherein said modifying  
 2 comprises forming a device tree data structure that is representative of  
 3 the storage system.

1 28. The method according to claim 27, wherein said modifying  
 2 comprises reassigning data stores to components of the data storage  
 3 system.

1 29. The method according to claim 28, wherein said implementing  
 2 the modified design comprises forming a plan for migrating data and  
 3 then implementing the plan.

1 30. The method according to claim 29, wherein said forming a plan  
 2 comprises forming a directed multigraph and computing a maximum  
 3 general matching.

1        31.    The method according to claim 25, wherein said modifying is  
2        also performed in response to a desired headroom level.

1        32.    The method according to claim 31, wherein said desired  
2        headroom level provides that components of the data storage system  
3        operate at less than 100% utilization.

1        33.    The method according to claim 31, wherein said desired  
2        headroom level provides that components of the data storage system  
3        operate at more than 100% utilization.

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